October 24, 2012

To All Who Share Our Passion For Lake Tahoe

It is my privilege, as Executive Director of the Tahoe Regional Planning Agency, to present the *2011 Threshold Evaluation Report*, a vast assemblage of data that offers a snapshot of the environmental health of Tahoe Region and evaluates the implementation and effectiveness of the *1987 Regional Plan*. This fifth Report in a series since 1991 is produced by TRPA in collaboration with partner agencies and research institutions every five years.

The 2011 Report is a noteworthy milestone. It marks the first time that the entirety of the Report, from the science, data, and the analyses to the conclusions and recommendations, has been independently peer-reviewed and validated. Seven scientists of widely varied disciplines from nationwide institutions unconnected to TRPA or the Tahoe Basin agree that this year's report "was seen as a major improvement as compared to earlier planning documents" and "is technically sound and provides a credible basis to support ongoing TRPA policy-making." (Peer Review Executive Summary). The new reporting approach is more transparent, measures and reports more than ever before, and provides information at a finer scale of investigation to help frame more effective public policy discussions.

With that endorsement, the Report is the essential tool needed to step confidently into our collective charge of updating the 1987 regional vision. Notably, the peer review urges a landscape perspective, stepping back to consider and apply the results on a larger scale. The TRPA Governing Board and its Advisory Planning Commission sit at that perfect scale–the Region–to evaluate the big picture of land use practices and their implications. Too small a scale can lose the context and introduce an isolated perspective and too big a scale tackles other issues not within TRPA's purview. Our job is to recognize and evaluate connections across the larger landscape among resource values, weigh the sustainability objectives and resource constraints, and diagnose best practices that will facilitate wise management.

We have the benefit of this information to assist in advancing an update to the *1987 Regional Plan*. The results are encouraging: many environmental indicators are showing positive trends and those that are not are resource areas we've prioritized in recent years. The data around water quality reinforces the need for public-private partnerships to continue the commitment to restoring the Lake's world-famous clarity.

Recognizing that science does not work on the same time-scale as political decision-making, even with this powerful compilation of data and analyses, there is never as much information as we would like. But to borrow from the wisdom of the peer review, when faced with uncertainty, giving precedence to simplicity is preferred as we step into the difficult and collaborative task of evaluating and challenging the need for change in the status quo.

We are proud to present this information to the Tahoe Basin and we urge all who share our passion for Lake Tahoe to join us in protecting and restoring this spectacular place.

Sincerely,

Joanne S. Marchetta
Executive Director, Tahoe Regional Planning Agency

Executive Summary

The Tahoe Regional Planning Agency has produced a Regional Plan and Threshold Review every five years as mandated in the TRPA Regional Plan. The *2011 Threshold Evaluation* (the Report) is the fifth report presented to the Governing Board and the public since the adoption of the *1987 Regional Plan*. The purpose of the Threshold Evaluation is to:

- Assess the effectiveness of the implementation of the *1987 Regional Plan* in achieving and maintaining Threshold Standards
- Report the degree and rate of progress toward attainment of adopted Threshold Standards and applicable local, state, and federal air and water quality standards
- Provide recommendations on additional actions that will promote Threshold Standard attainment and maintenance or otherwise improve the effectiveness of the Agency

A brief summary of the historical context of the Region sets the stage for understanding the Report's findings:

Lake Tahoe and its surrounding natural landscapes are cherished because they provide for extraordinary recreation and scenic experiences. The Lake itself is one of the largest and deepest in the world and the unique water clarity and stunning natural landscape has drawn people to its shores for centuries.

Between 1900 and 1960, Lake Tahoe became a recreation destination. Following World War II and improvements in automobile transportation infrastructure, Nevada casinos and small recreation retreats were developed to better accommodate a more mobile and affluent society. The economic momentum of the 1960 Winter Olympics at Squaw Valley spawned a significant uncontrolled expansion of development at Tahoe; including the completion of the Tahoe Keys subdivision that was responsible for the fragmentation of a significant freshwater marsh system critical for filtering sediment and nutrients from entering Lake Tahoe. Late in the 1960s, rapid development and lax regulatory standards spurred the governors of California and Nevada to enter into the first bi-state, federally ratified agreement, the Tahoe Regional Planning Compact, resulting in the creation of the Tahoe Regional Planning Agency in 1969.

The 1969 *Bi-State Compact* directives were found to be insufficient in protecting Lake Tahoe's ecosystem. Therefore, in 1980, the Compact was revised and charged TRPA with leading the cooperative effort to preserve, restore, and enhance the unique natural and human environment of the Lake Tahoe Region. The amended 1980 Compact directed the agency to adopt environmental

quality standards known as Environmental Threshold Carrying Capacities (or Threshold Standards) to better focus environmental quality objectives and to address the impacts resulting from urban development and different land uses through the implementation of a regional land use plan.

Threshold Standards set environmental quality targets to protect and maintain the unique natural values of the Tahoe Region while still providing for orderly growth and development consistent with those standards. By protecting environmental quality, it was thought that socioeconomic conditions would be improved and sustained because the Region's economy and community were highly dependent on visitor and resident outdoor experience and quality of life. In response to the 1980 Compact, the *1987 Regional Plan* implemented a broad suite of policies, ordinances, and land use zoning requirements and controls designed to guide the Region toward achievement and maintenance of adopted Threshold Standards. Between 1987 and 2010, TRPA adopted amendments to the *1987 Regional Plan* to incorporate best available science and to accommodate environmentally beneficial projects and programs.

Because the urban development that existed prior to the *1987 Regional Plan* continued to affect the environmental conditions of the Region, it soon became clear that regulation alone would not achieve and maintain adopted Threshold Standards. To address these legacy impacts, TRPA launched the Environmental Improvement Program (EIP) in 1997. The EIP secured public and private funding for on-the-ground implementation of erosion control measures, riparian area restoration, transportation, forest health, and other environmentally beneficial programs and projects.

Today, evidence from available status and trend monitoring data, and applied research suggests that the elements of the *1987 Regional Plan* overall have reduced the rate of Lake clarity decline when compared to conditions prior to 1987and contributed to improved environmental conditions in the Lake Tahoe Region. Under the *1987 Regional Plan*, TRPA implemented a number of regulatory control measures and facilitated on-the-ground restoration and redevelopment that, based on available data, contributed to progress in Threshold Standard attainment and maintenance. Notwithstanding overall progress, the Threshold Evaluation found that some indicators for standards within Air Quality, Water Quality, Noise, Wildlife, Vegetation, Scenic Resources, and Soil Conservation Threshold Categories are short of attainment. Factors contributing to a "non-attainment" determination for different standards varied, but overall the Report found that issues associated with legacy land uses and urban development that preceded the *1987 Regional Plan* are responsible. The Report also noted that the basis for some of the adopted standards should be reviewed and revised as some standards may not be achievable, associated indicators are not informative, or issues, such as the threat of aquatic invasive species, have emerged that were not anticipated in 1982 when Threshold Standards were adopted.

Summary of Findings

The *2011 Threshold Evaluation* provides a snapshot of the overall environmental health of the Tahoe Basin and is the fifth report published since the adoption of the Regional Plan in 1987.

- An independent panel of scientists coordinated by the Tahoe Science Consortium reviewed the 2011 Report and found it to be technically sound. The peer review stated the *2011 Threshold Evaluation* represents a significant improvement over previously published reports. The panel commended TRPA for using a more transparent process to determine threshold attainment status at the standard level.
- TRPA addressed 151 environmental standards and made a status determination on 92 of these standards. Of these, 62 percent were attained or implemented and 38 percent have not yet been attained.

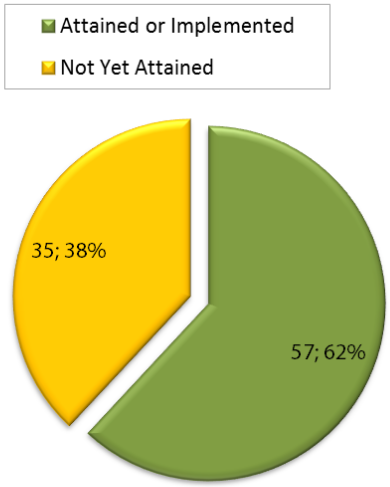
- Overall, the Report found the Regional Plan, through the partnerships of many federal, state, local, and private organizations, has made progress on improving environmental quality.
- **Water Quality:** The rate of Lake Tahoe annual clarity decline has slowed over the last decade. The winter clarity threshold indicator met the interim target of 78.7 feet (2011 measured 84.9 feet) and is trending toward attainment of 109.5 feet. Trends in stream water quality indicated that conditions have not declined over time. However, summer lake clarity and nearshore conditions are highlighted as major areas of concern.
- **Air Quality:** The Tahoe Basin made air quality gains over the last five years. The majority of air quality indicators in the Lake Tahoe Basin were at or better than attainment with adopted standards. The Report shows that indicators for carbon monoxide and vehicle-miles-traveled moved from non-attainment into attainment. Federal and state tailpipe and industrial emission standards have likely contributed to this achievement along with local projects which delivered walkable, transit-friendly improvements such as the Heavenly Gondola in South Lake Tahoe.
- **Soil Conservation:** An analysis of impervious cover (land coverage) showed that seven of nine indicators were in attainment with threshold targets, however, sensitive wetlands and very steep lands are "over-covered" which can negatively affect water quality and other resources. Stream zone restoration efforts implemented by TRPA partner agencies are making progress in achieving restoration goals with more needing to be done.
- **Scenic Resources:** The Tahoe Basin made gains in scenic quality over the last five years. Overall, compliance with scenic quality standards is at 93 percent with an improving trend in scenic quality for the built environment. Developed areas along roadways and Lake Tahoe's shoreline continue to be the locations where scenic improvements are needed.
- **Vegetation:** The Regional Plan and partner agencies have successfully protected sensitive plant species, keeping those standards in attainment. However, a couple of uncommon plant communities fell short of attainment because of non-native species; beaver, aquatic invasive species and noxious weeds were identified as potential threats to the integrity of uncommon plant communities. Progress is being made on fuels reduction and forest ecosystem restoration.
- **Recreation:** Both Recreation Threshold Standards have been implemented and are in attainment. TRPA partners have made substantial progress in upgrading recreational facilities through the Environmental Improvement Program.
- **Fisheries:** TRPA and partner agencies have implemented a robust aquatic invasive species control and prevention program; however, aquatic invasive species continue to be a major area of concern because their threat to fisheries and other aquatic biota.
- **Wildlife:** Indicators for special interest wildlife species show stable or improving conditions. TRPA's development regulations have protected riparian wildlife habitats and partner agencies are making progress restoring these valuable habitats.
- **Noise:** TRPA and the peer review panel recommended that noise standards and evaluation approaches be re-evaluated. The majority of standards were determined to be out of attainment as a result of a 'no exceedance' interpretation of the standard and that TRPA has little enforcement authority to address many noise issues – in particular, single event noise.
- TRPA and the peer-review panel highlighted data gaps and the need to continue ongoing work to update Basin-wide monitoring programs. The scientific panel made recommendations to include conducting additional analysis to improve future reports.

Threshold Indicator Status

This report addressed the status of a total of 151 standards[1] associated with 30 Indicator Reporting Categories and 9 Threshold Categories (Figure ES-1). Nearly all standards—approximately 90 percent—of the 151 standards are Numerical Standards or Management Standards with numeric targets. Because of the lack of available data, status determinations could be made for only 49 percent of numerical indicators. Of the 78 indicators for which a status determination was made relative to Numerical Standards, it was found that 55 percent were "at or better than target" or "considerably better than target." The implementation status of 14 Management Standards and Policy Statements was qualitatively evaluated and determined that 100 percent of these types of standards have been implemented through TRPA, state, and/or federal regulatory controls and/or are addressed as a component of on-the-ground environmental improvement efforts.

Overview of Indicator Status

Category	Total Standards Addressed	Number Attained	Number Unknown
Air Quality	20	14 of 15	5
Water Quality	44	1 of 6	38
Soil Conservation	10	7 of 10	0
Scenic Resources	5 (860 Units)	5 of 5 or 802 of 860 units	0
Wildlife	11	5 of 8	3
Fisheries	7	4 of 4	3
Vegetation Preservation	26	14 of 24	2
Recreation	2	2 of 2	0
Noise	26	5 of 18	8



Unknown = 59 of 151 standards

Figure ES-1. *One hundred and fifty one standards were addressed in this report. Of those 151 standards, we were able to make a status determination for 92 indicators. As shown in the pie chart on the right, of the 92 standards that we were able to make a determination on status, 57 of them, or 62% were implemented or in attainment and 35 indicators, or 38% of the standards have not yet been attained. There were certain standards that we had to classify indicators as "unknown" because it was not clear what the standard was, or there were insufficient data to make a determination. Overall, there were 59 instances in the report where we had to make a determination of "unknown."*

[1] *Note: There are 860 separate scenic assessment units, each with a specific target standard in five separate scenic standard categories enumerated here. Because of the volume of standards associated with the Scenic Resource Threshold Category, the indicator results were aggregated for this summary.*

Threshold Indicator Trends

Trends relative to Numerical Standards were determined for 42 percent of indicators in this Report (Figure ES-2). A trend determination could not be made for approximately half of the indicators because of differences in analytic approaches used across past evaluations or because data was insufficient to make a determination on trend. Of the 64 indicators in which a trend could be determined, it was found that 28 percent were moderately or rapidly improving relative to the standard and there was little or no change in 64 percent of the indicators (Figure ES-2). Four indicators displayed a moderate decline relative to standards (indicators related to: annual average Lake Transparency; noise associated with airport and urban outdoor recreation land uses; and the Osgood Swamp uncommon vegetation community) and one showed a rapid decline (pelagic Lake Tahoe primary productivity). Trends were not assessed for non-numeric Policy Statements and Management Standards.

Summary of Indicator Trends

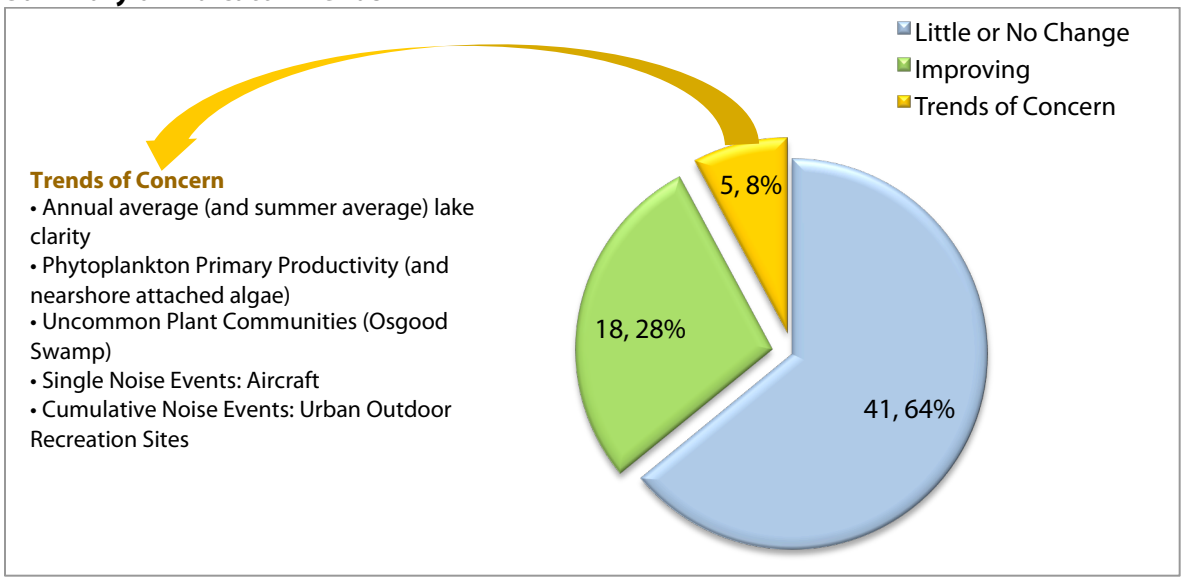


Figure ES-2. *A trend determination was made for 64 of the 151 indicators addressed in this Report. Trends were not determined for qualitatively evaluated management standards and policy statements, or when data were insufficient.*

Confidence in Status and Trend Determinations

New to this evaluation is a rating of how much confidence there is in an indicator's status and trend determination. This rating system is based on the quality, representativeness and extent of data used, and statistical characteristics of trend models. Of the 151 standards addressed in this Report, a confidence rating was assigned to 85 of the indicators. Confidence ratings were not applied to the 14 Policy Statement and non-numeric Management Standard assessments or to indicators in which both the status and trend was determined to be unknown. Of the confidence ratings that were applied to status and trend determinations, 50 were determined to be either "moderate" or "high" and 35 were rated "low." These results suggest TRPA and partner agencies need additional resources to fulfill monitoring and reporting mandates.

Implementation and Effectiveness of the 1987 Regional Plan

Using a combination of strict growth management regulations and substantial capital investment in environmental restoration—including public land acquisitions--the implementation of the 1987 *Regional Plan* has in most respects been a success. TRPA regulations have substantially reduced the rate of urban development and virtually halted new urban development on sensitive lands in the Tahoe Region (Figure ES-3; Raumann and Cablk 2008). In a number of cases, approved projects have resulted in a net gain of open space, enhanced capacity to treat polluted urban stormwater, and reduced the dependency on the private automobile consistent with the directives of the TRPA Compact.

Available Lake Tahoe clarity monitoring data suggests that implementation of the regulations together with the Environmental Improvement Program may have aided in reversing the declining trend in average winter Lake transparency (Figure ES-4). While summer clarity data shows a decline and remains a concern, the average rate of decline in lake clarity has slowed over the last decade. Nearshore conditions, including algae attaching to rocks on the shoreline, and declines in native benthic macroinvertebrates and fishes, are showing negative trends. Research on causes, recommended indicators and additional management programs is ongoing in this important resource area.

The peer-review panel noted other indicators should be considered when looking at Lake Tahoe's water quality overall. For example, using the Carlson Trophic Status Index, data suggests that Lake Tahoe is still maintaining its unique ecological status as an "*ultraoligotrophic*" lake (Figure ES-5)[2].

[2] *The trophic status of a lake is the degree of biological production within a lake-a key component of Lake Tahoe's water quality. Trophic status is usually based on the total mass of algae in a lake, which is represented by the concentration of photosynthetic pigment (chlorophyll-a) in water samples. Ultraoligotrophic lakes contain very low levels of nutrients (such as phosphorus), which acts to limit biological production, meaning a lower algal biomass. Oligotrophic and ultraoligotrophic lakes tend to have extremely clear water and relatively high levels of dissolved oxygen throughout the year. In other lakes where biological productivity is extremely high, water quality can be impaired to the point where fish die-offs occur and some recreational activities such as swimming may not be advisable. The concept of trophic status is based on the fact that changes in nutrient levels (measured by total phosphorus) causes changes in algal biomass (measured by chlorophyll a) which in turn causes changes in lake clarity (measured by Secchi disk transparency).*

Tahoe Basin Rate of Development

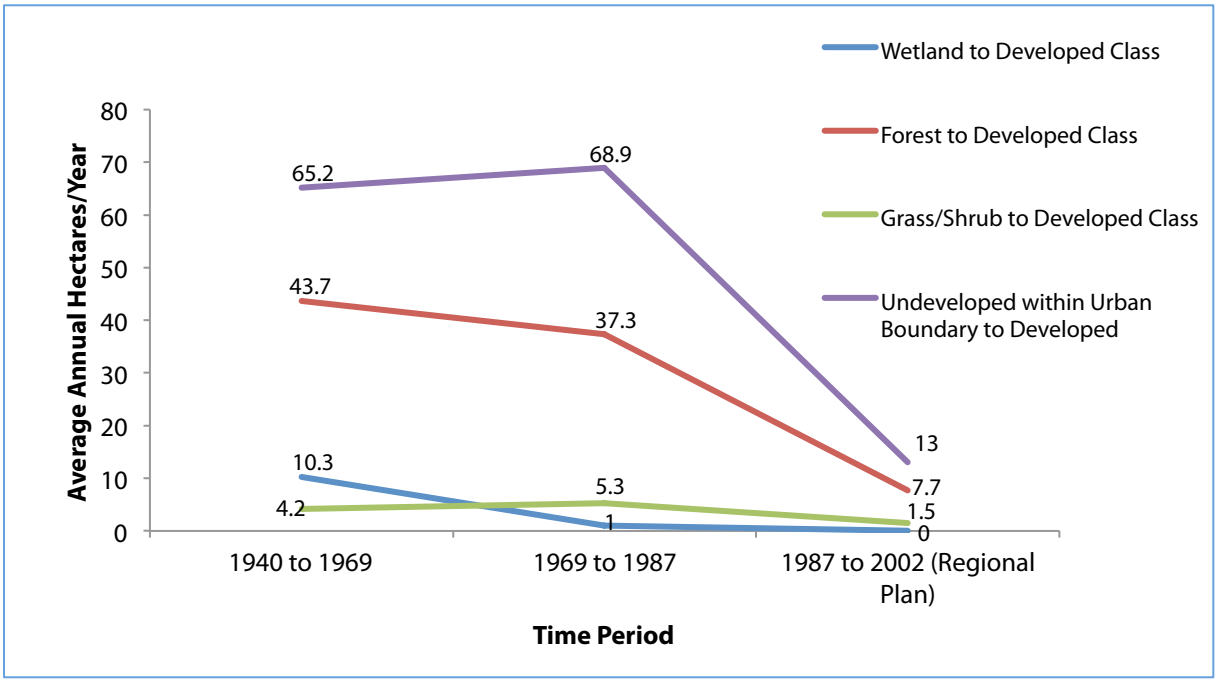


Figure ES-3. *Average annual change (hectares/year) in major land use/cover classes from 1940 to 2002 in the southern portion of the Lake Tahoe Basin (adapted from Raumann and Cablk 2008). Since the implementation of the Regional Plan in 1987 (1987 to 2002 time period) the rate of lands converted to the developed/impervious class has declined dramatically, in some cases to zero, when compared to the time periods up to and prior to 1987. (1 hectare = 2.5 acres)*

Average Winter Secchi Depth

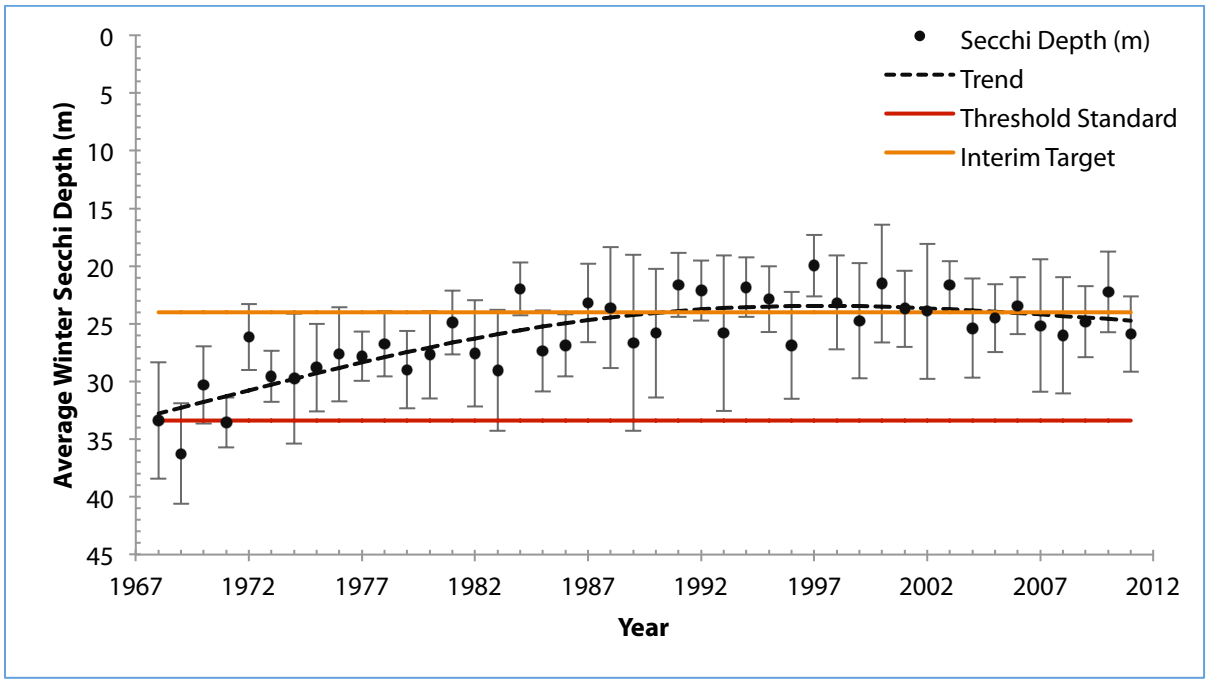


Figure ES-4. *Average winter Secchi disk depth measurements (± 1 Standard Deviation) relative to interim targets and Threshold Standard from 1968 to 2011. Each value is the mean of 5 to 13 individual measurements taken at the Lake Tahoe index station from December through March. The 2011 measured value (25.9 m or 84.9 ft) was determined to be somewhat worse than TRPA's adopted standard of 109.5 ft, but was determined to be at or better than the interim target of 24 m identified by TRPA in the 2006 Threshold Evaluation. The long-term trend has shown a historically declining condition between 1968 and 1987, but in more recent years (2001-2011) exhibits a trend of moderate improvement. Data source: UC Davis – Tahoe Environmental Research Center.*

Carlson's Trophic Status Index

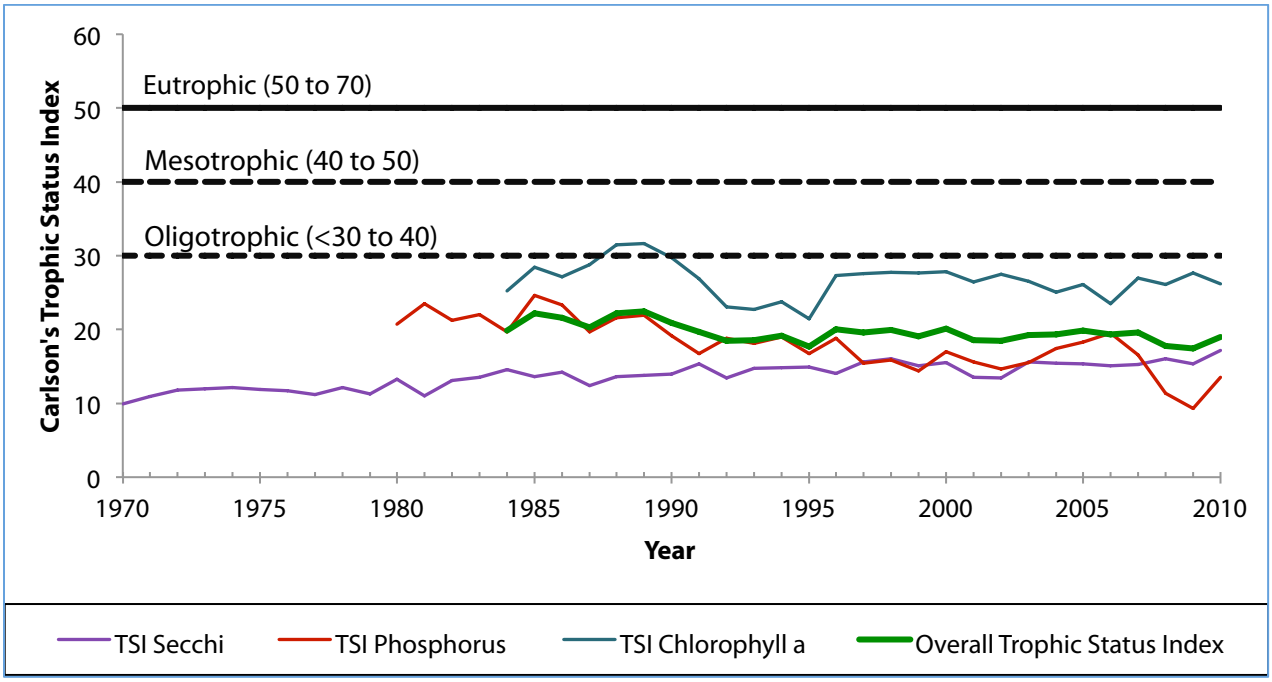


Figure ES-5. *Graph showing the application of Carlson's Trophic Status Index to pelagic Lake Tahoe data.[3] The index uses a log transformation of measured Secchi disk values as a measure of algal biomass on a scale from 0 - 110. Each increase of 10 units on the scale represents a doubling of algal biomass. Because chlorophyll and total phosphorus are usually closely correlated to Secchi disk measurements, these parameters can also be assigned trophic status index values and can be combined to provide an integrated measure of trophic status. The Carlson Trophic Status Index is useful for comparing lakes within a region and for assessing changes in a lake's trophic status over time. The goal for Lake Tahoe is to maintain annual Carlson's Trophic Index values below 30. As of 2010, the integrated index value for Lake Tahoe's pelagic zone was 18.9, indicating the Lake is retaining its status as "ultraoligotrophic."*

While the agency can point to environmental improvement success stories, more needs to be done to facilitate shifts in the Tahoe Basin's land use pattern, which were expected to occur more rapidly based on the land use policies established in 1987. Stagnation of redevelopment and overly complex land use policies are reducing opportunities to improve environmental quality. Current land use policies lack adequate incentives to:

1) Accelerate the removal of impervious cover from sensitive lands
2) Increase the capacity to capture and treat urban stormwater before it enters Lake Tahoe
3) Enhance scenic quality
4) Improve air quality through reduced dependency on the private automobile.

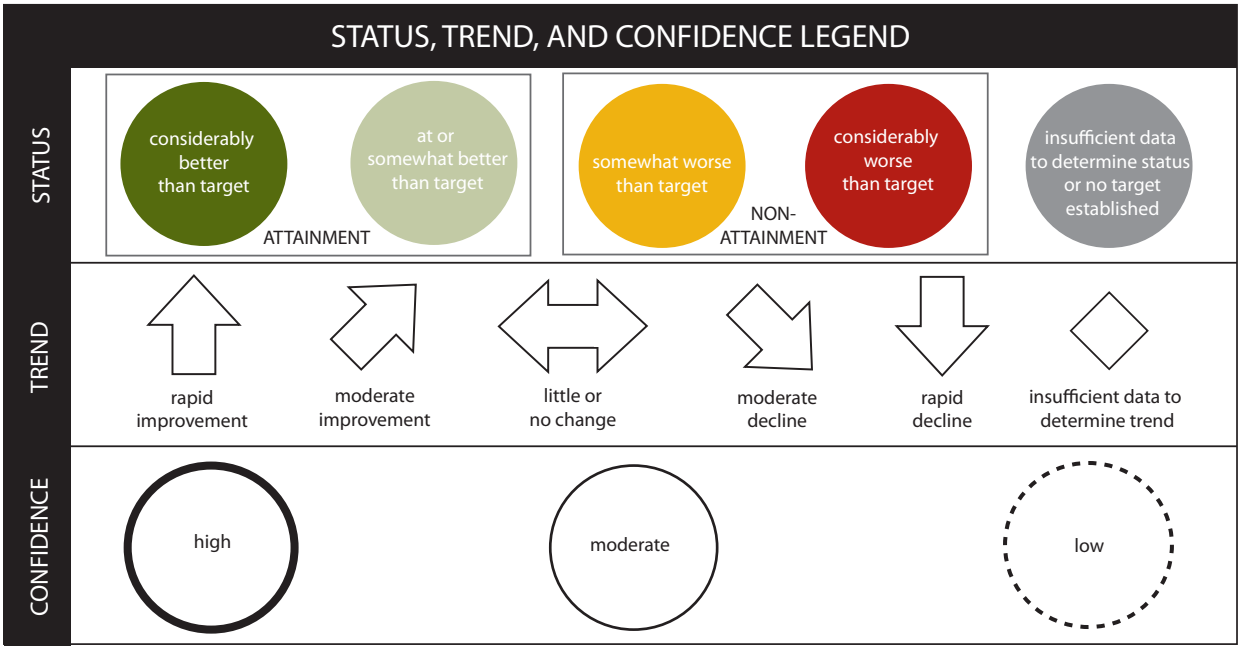
Since new development opportunities are substantially constrained at Lake Tahoe, the Report recommends revising land use policies to reshape antiquated development patterns as a key mechanism to achieve environmental goals.

[3] *TSI Secchi = 60 - 14.41 ln Secchi disk (meters); TSI Chlorophyll = 9.81 ln Chlorophyll a (µg/L) + 30.6; TSI Phosphorus = 14.42 ln Total phosphorus (µg/L) + 4.15; Overall Trophic Status Index = (TSI Secchi + TSI Phosphorus + TSI Chlorophyll a)/3.*

Interpreting Results in this Report

TRPA used a new system to show in finer-grained detail the status, trend, and confidence ratings of environmental threshold standards and indicators. The chart on the following pages shows the transition from previous Threshold Evaluations to the 2011 reporting system.

Reporting Icon Legends



Status Category	Description	Reporting Icon
Implemented	The Management Standard has been integrated into the *Regional Plan* as policy and/or as an ordinance or regulation and is consistently applied to a project design or as a condition of project approval as a result of project review process. Greater than three examples of programs or actions can be represented to support the Management Standard's implementation. Adopted programs or actions support all aspects of the Management Standard's implementation, or address all major threats to implementation of the Management Standard.	I
Partially Implemented	The Management Standard has been integrated into the *Regional Plan*, but is not consistently applied during the course of the project review process. No more than two examples of programs or actions can be identified to support the Management Standard's implementation and/or adopted programs or actions support some aspects of the Management Standard or address some major threats to implementation of the Management Standard.	PI
Not Implemented	The Management Standard has not been integrated into the *Regional Plan* and is not applied during the course of project review. No examples of programs or actions can be identified to support implementation of the Management Standard.	NI

Figure ES-6 and ES-7. *Legend for Status, Trend, and Confidence reporting icons used for status & trend determinations in this report.*

Crosswalk Transition Chart

2006 "Threshold Indicator"[4]	2011 Indicator Reporting Categories[5]	Status and Trend of "*Threshold Indicators*" as Determined with Approach Used in Previous Threshold Evaluations			Characterization of Overall Status and Trend for Indicator Reporting Categories as Determined with New Aggregation Approach and Reported in the *2011 Threshold Evaluation*	
		2006 Status	2011Status[6]	Trend[7]	2011 Indicator Reporting Category Status Summary[8]	2011 Trend[9]
AQ-1 CO	Carbon Monoxide	Non-Attainment	Attainment	↑	Considerably better than target	Rapid Improvement
AQ-5 US 50 Traffic Volume		Attainment	Attainment	↑		
AQ-2 O_3	Ozone	Non-Attainment	Non-attainment	=	At or somewhat better than target	Little or No Change
AQ-3 Particulate [Matter]	Visibility	Non-attainment	Non-attainment	↑	At or somewhat better than target	Little or No Change
AQ-4 Visibility		Attainment	Attainment	=		
AQ-6 Wood Smoke		Unknown	Unknown	=		
AQ-7 VMT		Non-attainment	Attainment	↑		

[4] Reporting categories used in previous Threshold Evaluations were referred to as "Threshold Indicators"
[5] Aligned with Threshold Standard categories adopted in Resolution 82-11
[6] Status determination that would have been assigned to the "Threshold Indicator" according to previous Threshold Evaluation's attainment status determination approach. According to this approach all indicators within the reporting category are required to be in compliance with the Threshold Standard in all years within the 5-year reporting period in order for the "Threshold Indicator" to be determined to be "attained".
[7] Based on staff's best profession judgment. Trend icon used in previous Threshold Evaluations: Positive Trend "↑"; Negative Trend "↓"; No Trend "="; Unknown = "Unk"
[8] Status determination based on the aggregation of all indicators within an Indicator Reporting Category. This approached was used for the 2011 Threshold Evaluation solely to characterize the overall status of indicators relative to standards within an Indicator Reporting Category. Status determinations at the Indicator Reporting Category are not to be misconstrued as a status and trend determinations made for individual Threshold Standards unless only one standard exists within an Indicator Reporting Category.
[9] Trend determination based on the aggregation of all indicators within an Indicator Reporting Category. This approach was used for the 2011 Threshold Evaluation solely to characterize the overall trends of indicators relative to standards within an Indicator Reporting Category. Trend determinations at the Indicator Reporting Category are not to be misconstrued as a trend determination made for individual Threshold Standards unless only one standard existed within an Indicator Reporting Category.

2006 "Threshold Indicator"[4]	2011 Indicator Reporting Categories[5]	Status and Trend of "*Threshold Indicators*" as Determined with Approach Used in Previous Threshold Evaluations			Characterization of Overall Status and Trend for Indicator Reporting Categories as Determined with New Aggregation Approach and Reported in the *2011 Threshold Evaluation*	
		2006 Status	2011Status[6]	Trend[7]	2011 Indicator Reporting Category Status Summary[8]	2011 Trend[9]
AQ-8 Atmospheric Nutrient Loading	Nitrate Deposition	Unknown	Attainment	=	Implemented	Not Applicable
Not Addressed	Odor	Not Assessed	Not Assessed	Unk	Implemented	Not Applicable
WQ-1 Turbidity	Littoral Lake Tahoe	Attainment	Unknown	Unk	Unknown	Unknown
WQ-2 Clarity, Winter	Pelagic Lake Tahoe	Non-Attainment	Attainment[10]	↑	At or somewhat better than interim target, Somewhat worse than standard	Little or No Change
WQ-3 Phytoplankton (PPr)	Pelagic Lake Tahoe	Non-attainment	Non-attainment	↓	Considerably below target	Rapid Decline
WQ-4 Tributary Water Quality	Tributaries	Non-attainment	Non-attainment	↓	Somewhat worse than target	Moderate Improvement
WQ-5 Runoff Water Quality	Surface Runoff	Non-attainment	Unknown	Unk	Unknown	Unknown
WQ-6 Groundwater	Groundwater	Non-attainment	Unknown	Unk	Unknown	Unknown
WQ-7 Other Lakes	Other Lakes	Non-attainment	Unknown	Unk	Unknown	Unknown
SC-1 Impervious Cover	Impervious Cover	Non-attainment	Non-attainment	Unk	At or somewhat better than target	Unknown

[10] *Meeting "interim target"; not meeting Threshold Standard.*

2006 "Threshold Indicator"[4]	2011 Indicator Reporting Categories[5]	Status and Trend of "*Threshold Indicators*" as Determined with Approach Used in Previous Threshold Evaluations			Characterization of Overall Status and Trend for Indicator Reporting Categories as Determined with New Aggregation Approach and Reported in the *2011 Threshold Evaluation*	
		2006 Status	2011Status[6]	Trend[7]	2011 Indicator Reporting Category Status Summary[8]	2011 Trend[9]
SC-2 Naturally Functioning SEZ	Stream Environment Zone	Non-attainment	Non-attainment	↑	Considerably worse than target	Moderate Improvement
V-1 Relative Abundance and Pattern	Common Vegetation	Non-attainment	Non-attainment	Unk	Somewhat worse than target	Unknown
V-2 Uncommon Plant Communities	Uncommon Plant Communities	Attainment	Non-attainment	=	At or somewhat better than target	Little or no change
V-3 Sensitive Vegetation	Sensitive Plants	Attainment	Attainment	↑	Considerably better than target	Little or no change
V-4 Late Seral/Old Growth	Late Seral and Old Growth	Non-attainment	Non-attainment	Unk	Considerably worse than target	Unknown
F-1 Lake Habitat	Lake Habitat	Non-attainment	Attainment	Unk	At or somewhat better than target	Unknown
F-2 Stream Habitat	Stream Habitat	Unknown	Unknown	=	Unknown	Unknown
F-3 Instream Flows	Instream Flows	Attainment	Attainment	=	Implemented	Not Applicable
F-4 Lahontan Cutthroat Trout	Lahontan Cutthroat Trout	Attainment	Attainment	↑	Implemented	Not Applicable
W-1 Special Interest Species	Special Interest Species	Non-attainment	Non-attainment	↑	At or somewhat better than target	Moderate Improvement
W-2 Habitats of Special Significance	Habitat of Special Significance	Non-attainment	Non-attainment[11]	↑	Implemented	Not Applicable

[11] *Previous Threshold Evaluations used the SEZ indicator determination as a surrogate to habitats of special significance.*

2006 "Threshold Indicator"[4]	2011 Indicator Reporting Categories[5]	Status and Trend of "*Threshold Indicators*" as Determined with Approach Used in Previous Threshold Evaluations			Characterization of Overall Status and Trend for Indicator Reporting Categories as Determined with New Aggregation Approach and Reported in the *2011 Threshold Evaluation*	
		2006 Status	2011Status[6]	Trend[7]	2011 Indicator Reporting Category Status Summary[8]	2011 Trend[9]
SR-1 Travel Route Ratings	Roadway and Shoreline Units	Non-attainment	Non-attainment	↑	At or somewhat better than target	Moderate Improvement
SR-2 Scenic Quality Ratings		Non-attainment	Non-attainment	=		
SR-3 Public Rec. Area Scenic Quality Ratings	Other Areas	Non-attainment	Non-attainment	=	At or somewhat better than target	Little or no change
SR-4 Community Design	Built Environment	Non-attainment	Non-attainment	↑	Implemented	Not Applicable
N-1 Single Event (Aircraft)	Single Noise Events	Unknown	Non-attainment	↓	Somewhat worse than target	Unknown
N-2 Single Event (Other)		Non-attainment	Non-attainment	Unk		
N-3 Community Noise	Cumulative Noise Events	Non-attainment	Non-attainment	=	Somewhat worse than target	Little or no change
R-1 High Quality Recreational Experiences	Quality of Recreation Experience	Attainment	Attainment	↑	Implemented	Not Applicable
R-2 Capacity Available to the General Public	Fair Share Distribution of Recreation Capacity	Attainment	Attainment	↑	Implemented	Not Applicable

Findings by Threshold Category

Water Quality Status & Trend Summary

Indicator Reporting Category	Status &
Pelagic Lake Tahoe	
Littoral Lake Tahoe	
Tributaries	
Surface Runoff (runoff water quality to surface waters)	
Groundwater (runoff water quality to soil surface)	
Other Lakes	

Lake Tahoe's extraordinary water clarity is world-renowned. TRPA and state agencies have adopted strict water quality standards to ensure that management strategies associated with Lake Tahoe waters restore and maintain the Lake for current and future generations. A wide variety of water quality related policy and management actions have been implemented to improve water quality, but the Region continues to struggle both to meet and also to collect sufficient data to assess the multitude of standards established for Lake Tahoe and other regional waters.

Water Quality Threshold Standard Goal: *To reduce nutrient and sediment loads for surface runoff, groundwater and atmospheric sources to meet 1967 to 1971 levels of algae and water transparency measured in Lake Tahoe.*

Findings and Conclusions: Water quality shows signs of improvement as well as areas of concern. The trend for winter average Secchi depth shows that the indicator is no longer declining and the Region is meeting interim targets established in 2006; additional improvements in lake clarity are needed to meet the adopted Threshold Standard. The annual average Secchi depth indicator is still considerably short of attaining both the interim target and adopted Threshold Standard, although the rate of Lake clarity decline has slowed since 2001. Summer clarity is showing declining trends and ongoing research findings are needed to understand why winter and summer readings are moving in seemingly opposite directions.

The long-term trend in the phytoplankton primary productivity indicator continues to show a rapid decline, although the indicator has improved in the last two years. Research noted in the Lake Habitat Indicator Category (see Chapter 7: Fisheries) is underway assessing possible relationships of phytoplankton to other nearshore conditions. Long-term measurements of stream water quality indicate that the Region is not meeting state pollutant concentration standards, although improvements in sediment and phosphorus concentration are noted. Long-term data on pollutant loading indicates that there was little or no change in the amount of nitrogen, sediment, and phosphorus being delivered to Lake Tahoe annually via tributaries. Several information gaps related to indicators are noted and recommendations are forwarded to address this issue.

Recommendations: Proposed Regional Plan strategies for achieving the water quality thresholds include continuing the requirement to install permanent and temporary BMPs, maintaining growth management tools (e.g. use of development allocations, land coverage limitations, and urban boundary delineations), preserving and restoring stream zones, and prohibiting the discharge of

wastewater, toxic waste, and solid waste into Lake Tahoe, its tributaries, and groundwater resources. Additional actions proposed in the Regional Plan Update are projected to accelerate water quality improvements include accelerating BMP implementation to help achieve TMDL goals through area-wide approaches, reducing automobile use through new improvements to public transit and alternative transportation modes, greater flexibly in use of air and water quality mitigation funds to support priority water and air quality improvements and encouraging environmental redevelopment through the use of incentives associated with the transfer of development from sensitive lands.

Air Quality Status & Trend Summary

Indicator Reporting Category	Status & Trend
Carbon Monoxide	
Ozone	
Visibility	
Nitrate Deposition - Reduce generation and transport of nitrate to achieve water quality standards	
Odor - Reduce diesel engine fumes	

Air quality conditions in the Lake Tahoe Basin are generally favorable. Air pollutants can, however, affect human health, scenic quality, forest health, and water quality.

Air Quality Threshold Standard Goal: *To improve and maintain air quality to protect human health, scenic values and environmental quality, and reduce vehicle traffic volume.*

Findings and Conclusions: The majority of air quality indicators are in attainment with adopted standards. Trends primarily indicate that air quality indicators are either stable or improving. Actions implemented to improve air quality in the Lake Tahoe Region occur at the national, state, and regional scale. The U.S. Environmental Protection Agency and state agencies, such as the California Air Resources Board, have established vehicle tail-pipe emission standards and industrial air pollution standards. These actions have resulted in substantial reductions in the emissions of harmful pollutants at state-wide and national scales and likely have contributed to improvement in air quality at Lake Tahoe. At a regional scale, TRPA has established ordinances and policies to encourage alternative modes of transportation and to reduce vehicle idling by prohibiting the creation of new drive-through window establishments. TRPA also requires woodstoves to be compliant with EPA standards when properties are bought and sold. The Tahoe Transportation District operates a low-emission mass transit system and the EIP facilitates the construction of bike paths. Redevelopment projects can also benefit air quality—the Heavenly Gondola Project likely contributed to reductions in private automobile use in an area of the Region that receives the greatest annual volume of winter visitors.

Recommendations: Peer reviewers recommend remaining vigilant on maintaining Lake Tahoe's protective air quality standards and opportunities exist for improvement. For example, many of the community centers in the Region do not have existing infrastructure to encourage alternative modes of transportation. Community centers could be improved to better accommodate pedestrians and alternative access transportation modes, such as bicycle paths. Additional measures to reduce

pollutants associated with residential wood burning can be considered, such as creating additional incentives to convert non-compliant woodstove and fireplaces to meet EPA emission standards, or to mandate "no burn days" when ambient air quality conditions are predicted to exceed standards as is done in other regions.

Soil Conservation Status & Trend Summary

Indicator Reporting Category	Status & Trend
Impervious Cover	
Stream Environment Zones	

Soils support vegetation and provide a natural filter media for pollutants that affect Lake Tahoe's transparency. Ten Threshold Standards have been adopted by TRPA for the Soil Conservation Threshold Category and are assessed in this evaluation.

Soil Conservation Threshold Standard Goal: *To preserve and restore stream environment zones and limit impervious land cover.*

Findings and Conclusions: The Region overall is approximately 3 percent hard coverage and 0.9 percent soft coverage. The status of two of nine land capability classes (class 1b and 2) currently shows land coverage in excess of the Bailey system of land coverage limitations, according to an analysis of "LIDAR" and multi-spectral data (2010) and the 2007 soil survey from the Natural Resources Conservation Service. Legacy development created impervious coverage on sensitive lands classified as 1b and 2 prior to the adoption of the *1987 Regional Plan,* and continues to hamper achieving management targets set for impervious cover. New development has applied land cover limitations prescribed by the Impervious Cover Threshold Standards—where all parcels are limited in how much impervious coverage can be created on a parcel. Policies adopted by TRPA in 1987 to incentivize the transfer of excess impervious cover out of sensitive lands have not resulted in significant progress to this end (<40 acres of developed land has been transferred out of sensitive lands since the adoption of the 1987 Plan). Achievement of the impervious cover target will require the removal of an estimated 670 acres of impervious cover—a scale of coverage transfer that may not be achievable given private property rights issues and cost. Progress is being made to preserve and restore the natural hydrology of stream environment zone as prescribed by the Stream Environment Zone Threshold Standard.

Recommendations: Recommendations include the adoption of alternative policies related to incentivizing the transfer of impervious surface out of sensitive lands. Also recommended is to continue environmental restoration to re-establish the natural hydrology of stream environment zones.

Vegetation Status & Trend Summary

Indicator Reporting Category	Status & Trend
Common Vegetation	
Late Seral and Old Growth Forest Ecosystems	
Uncommon Plant Communities	
Sensitive Plants	

Vegetation plays a critical role in providing wildlife habitat, stabilizing soils and cleansing the air. The health and diversity of vegetation also contributes to achieving the Region's recreation and scenic quality goals.

Vegetation Preservation Threshold Standard Goal: *To maintain vegetation community richness and diversity, protect uncommon plant communities and sensitive plants, and increase the extent of old conifer forests.*

Findings and Conclusions: The Region is currently meeting most of the adopted standards for uncommon plant communities (e.g., Upper Truckee River, Taylor Creek, and Pope Marsh; Grass Lake and Hell Hole sphagnum fen) and sensitive plants (e.g., Tahoe yellow cress, Tahoe and Cup Lake Draba). However, the Region is short of attaining several standards for common vegetation (e.g., riparian vegetation) and younger age class forests (e.g., seral stage Red and Yellow Fir). Not meeting standards for Old Growth and Common Vegetation is primarily attributed to legacy land uses. Comstock era logging and the subsequent fire suppression policies have resulted in a forest that is overstocked with similarly aged conifer trees and has promoted the encroachment of conifer vegetation into riparian areas. Recent funding has facilitated the treatment of more than 45,000 acres of overly stocked conifer forests and over time is expected to result in a more resilient and healthy forest consistent with the goals of the Vegetation Preservation Threshold Standards. The implementation of the Tahoe Yellow Cress Conservation Strategy has proven to be successful in stabilizing the population of this endemic and threatened species. One area of concern includes preliminary results from research on the deep water plant communities. This research indicated the abundance of the community has substantially declined since last surveyed in the early 1960s; however, more research is needed to fully understand deep water plants.

Recommendations: The proposed Regional Plan Update continues existing policies needed to enhance vegetation in the Region. Recommendations encourage continued support of forest fuels reduction treatments, including increasing vegetation treatments in riparian areas. Improvements in vegetation monitoring and evaluation are needed to improve agencies' abilities to accurately characterize vegetation conditions and associated trends throughout the Region.

Wildlife Status & Trend Summary

Indicator Reporting Category	Status & Trend
Special Interest Species	
Habitats of Special Significance	

Wildlife play a critical role in perpetuating many valued forest ecosystem functions and contribute to visitors' and residents' outdoor recreation experience.

Wildlife Threshold Standard Goal: *To maintain and protect special interest species and enhance the suitability and extent of riparian habitats for wildlife.*

Findings and Conclusions: The Region is currently meeting most of the adopted Threshold Standards for wildlife. Several of the Wildlife Category Threshold Standards are imprecisely stated making them difficult to interpret. This fact, more than any human activity, accounts for conclusions that the standards have not been met. TRPA and partner agencies have set aside 50 percent of the Tahoe Basin landscape for protection of listed special status species. Trends in special interest species indicators are either stable or increasing. Current regulations cover all activities that have the potential to impact listed special interest species as well as riparian habitats known to support the greatest diversity of wildlife species in the Region. The Environmental Improvement Program is making substantial progress in restoring and enhancing stream habitats, including reinvigorating relatively uncommon aspen habitat.

Recommendations: The Tahoe Region needs additional reduction of legacy roads and trails in some areas known to support waterfowl and northern goshawk. These actions would build on past projects to decommission roads that would benefit species by reducing habitat fragmentation in areas critical for nesting. Recommendations include TRPA review and update of Wildlife Threshold Standards to better reflect best available science and reduce the ambiguity in the currently adopted standards. The Regional Plan Update maintains existing ordinances designed to protect special interests species and habitats. The Regional Plan Update proposes to amend the management standard for northern goshawk to increase the total area of suitable habitat protection for the species.

Fisheries Status & Trend Summary

Indicator Reporting Category	Status & Trend
Stream Habitat	
Instream Flows	
Lahontan Cutthroat Trout	
Lake Habitat	

Lake Tahoe's fishery contributes to the Region's biological diversity and recreation experiences.

Fisheries Threshold Standard Goal: *To improve and maintain lake and stream fish habitats, and to reintroduce Lahontan Cutthroat Trout to the Region.*

Findings and Conclusions: The Region is meeting most of the Threshold Standards for fisheries, although habitat conditions for streams remains unknown because of ambiguity associated with evaluating compliance with existing standards. Measuring other indicators would better characterize fish habitat conditions for streams and lakes. For example, although the Region is meeting adopted targets for Lake habitat, data indicates threats from aquatic invasive species and significant declines in native minnow species. Researchers at UC Davis, University of Nevada, and Desert Research Institute are nearing completion of a first phase of synthesis research needed to update monitoring procedures and better measure the condition of nearshore lake habitats. This research is anticipated to result in the integration of chemical, biological and physical indicators for the nearshore such that conditions of water quality, fisheries and aesthetic qualities can be more comprehensively reported. TRPA, in partnership with California and Nevada agencies, has already begun to make stream habitat monitoring program improvements by implementing state-endorsed stream bioassessment throughout the Tahoe Region. The U.S. Forest Service, in partnership with the California Department of Fish and Game, has successfully established a self-sustaining population of Lahontan cutthroat trout in the Upper Truckee Watershed. The U.S. Fish and Wildlife Service, through the Environmental Improvement Program, has been stocking Lahontan cutthroat trout into Fallen Leaf Lake for the past five years to test the feasibility of re-establishing populations back into regional lakes.

Recommendations: Reviewers recommend the continuation of the Lahontan cutthroat trout restoration work and other efforts designed to restore and enhance stream habitat conditions. The proposed Regional Plan Update would reinforce existing measures designed to protect and enhance lake and stream habitats, including support for the control and prevention of aquatic invasive species. The Regional Plan Update proposals to facilitate urban coverage removal from sensitive riparian areas and actions to more aggressively implement stormwater treatment facilities would benefit fish resources.

Noise Status & Trend Summary

Indicator Reporting Category	Status & Trend
Single Noise Events	
Cumulative Noise Events	

Excessive noise can impact wildlife habitat quality, visitors' experiences, and residents' quality of life. TRPA has adopted or recommended 27 standards for the Noise Threshold Category.

Noise Threshold Standard Goal: *To minimize single event noise and ambient noise levels consistent with the needs of wildlife and values held by regional residents and visitors.*

Findings and Conclusions: Single and Cumulative Noise Events indicators appear to be somewhat worse than targets, although data gaps and questions raised in the peer review about the methods of assessment in these Threshold Standard areas make these determinations questionable. Trends for each noise indicator ranged from "moderate decline" to "rapid improvement", but overall it was determined that "little or no change" has occurred in cumulative noise levels.

Recommendations: Peer reviewers found that the approach used to assess and report Single Event and Cumulative Noise Event conditions to be overly complex and recommend that it be comprehensively reviewed and simplified. They note that, as applied and interpreted, achieving adopted standards is infeasible. Enforcement too is challenging due to the transient nature of sources of noise and limited enforcement mechanisms to achieve adopted standards. Noise standards and assessment methodology should be reviewed and considered for adjustments.

Recreation Status & Trend Summary

Indicator Reporting Category	Status & Trend
Quality of Recreation Experience	
Fair Share Distribution of Recreation Capacity	

The Lake Tahoe area is a mecca for the outdoor recreation enthusiast. Recreation Threshold Standards recognize the value of improving and maintaining Lake Tahoe's environmental quality in order to perpetuate society's desire to recreate in the Lake Tahoe Region.

Recreation Threshold Standard Goal: *To improve and maintain a high quality outdoor recreation experience and ensure a fair share distribution of recreation opportunities across recreation providers.*

Findings and Conclusions: Both adopted Recreation Policy Statements have been implemented as elements of the Regional Plan and are in attainment. User surveys completed during the most recent evaluation period confirmed that the Region continues to provide for a high-quality recreation experience. Public agency land acquisition programs and the Environmental Improvement Program have contributed to visitors' and residents' satisfaction with the quality and spectrum of recreation opportunities. Partner agencies have improved existing and created new recreation facilities, including providing additional access to Lake Tahoe, hiking trailheads, and bicycle trails. Recreation capacity within the Region continues to be fairly distributed with 1,440 Person's At One Time (PAOTs)

allocations assigned by TRPA during this evaluation period.

Recommendations: 1) Coordinate with partner agencies and private entities to expand on the recreational user survey so as to assesses recreational experiences at a wider range of Forest Service and non-Forest Service sites, and 2) Reassess and update the PAOT allocation system with one that would more uniformly reflect recreation capacity regardless of the entity operating the facility. The Regional Plan will maintain policies designed to enhance the quality of outdoor recreation experiences.

Scenic Status & Trend Summary

Indicator Reporting Category	Status & Trend
Roadway and Shoreline Units	
Other Areas	
Built Environment	

The visual landscape of the Tahoe Region is one of its most impressive and memorable qualities. It possesses a striking combination of rugged mountain peaks, a vast lake surface, and forested slopes. These landscape elements work in concert to produce a visual impression that makes the Lake Tahoe Basin one of the truly unique places in the world.

Scenic Resources Threshold Standard Goal: *To improve and/or maintain scenic quality of the Region along roadways, Lake Tahoe's shoreline, at recreational sites and at other scenic viewpoints.*

Findings and Conclusions: The Tahoe Region attracts millions of visitors because of its stunning scenic quality and scenic improvements have been made to the built environment over the last five years. TRPA's scenic program encompasses one of the most complex and robust monitoring protocols of any of the nine threshold category areas. The Agency measures and monitors a total of 860 scenic units and assesses Threshold Standards in 5 separate roadway, shoreline, and recreation site categories. The Tahoe Basin has made scenic gains or held steady on all scenic measures over the last five years with no negative trends documented in any indicator categories. Overall, 93 percent (802 of 860) of the evaluated scenic resource units met minimum Threshold Standards. Developed areas along roadways and scenic resources along the Lake's shoreline continue to be areas of concern where additional scenic improvements are needed. A summary of the various scenic resources follows:

- 61 percent or 33 of the 54 Scenic *Highway* Corridors were determined to meet unit-specific Threshold Standards.
- Approximately 64 percent of *Shoreline* Scenic Corridors were determined to meet the Threshold Standard.
- Nearly all of the *Roadway* Scenic Resources—99 percent—met Threshold Standards, and 92 percent met *Shoreline* Scenic Resources Threshold Standards.
- Nearly all—96 percent—of *Recreation and Bike Trail* scenic resources met minimum Threshold Standards.

Trend data suggests that programs such as the EIP and management actions implemented such as adoption of the scenic shoreland ordinances along with building design standards in new

construction and redevelopment have improved scenic conditions and community character Region-wide.

Recommendations: Recommendations encourage continued implementation of scenic quality ordinances and EIP implementation of projects that will address non-attainment scenic units. In addition, recommendations suggest incentives to improve the scenic quality of developed areas through redevelopment or other means such as reducing sign clutter. Policy amendments to incentivize redevelopment in community centers are proposed in the Regional Plan Update. Redevelopment would allow TRPA to apply scenic quality design standards and thus aid in achieving scenic quality Threshold Standards for roadway units.

Agency Direction in Light of Threshold Evaluation Findings

The existing system for monitoring, measuring, and reporting on Threshold Standards is complex and challenging to implement. Recommendations address how to make progress on Thresholds Standards determined to be short of attainment, which Threshold Standards should be updated to reflect best available science, and the need to simplify the entire system. The recommendations are grouped in four categories:

- Regional Policies and Ordinances
- Environmental Improvement Program
- Threshold Standard Updates
- The Science and Monitoring Program

Regional Policies and Ordinances

- Revise policies, ordinances, and zoning to further incentivize the implementation of beneficial environmental projects as part of well-planned redevelopment of the existing built environment. Redevelopment should result in improved scenic quality and a net gain in stormwater treatment implementation and effectiveness.
- Modify policies to reduce dependency on the private automobile by creating accessible, frequent, and safe alternative modes of transit, such as policies to incentivize bicycle- and pedestrian-friendly town centers.
- Develop ordinances, programs, or measures that phase out the use of phosphorus fertilizers to significantly reduce this pollutant source.
- Review and consider policy revisions that hamper land managers' ability to restore vegetation communities in riparian areas.
- Work with appropriate jurisdictions to identify solutions to address noise standard exceedances. For example, the Agency could work with partner organizations to develop a set of best management practices that result in reduced construction-related noise.

Environmental Improvement Program (EIP)

- Prioritize and direct the use of TRPA Mitigation Fees to projects that yield the greatest environmental gain and target Threshold Standards in non-attainment.
- Prioritize projects for implementation within the following EIP focus and program areas:
    - Stormwater Management Program – prioritize erosion control and the treatment of stormwater that is directly connected to surface waters and closest to the Lake.
    - Watershed Management Program – prioritize the reclamation and restoration of impervious surfaces in lands classified as sensitive.
    - Invasive Species Program – continue to implement watercraft inspection programs to

prevent new introductions, control and reduce the expansion of known infestations of aquatic invasive species and noxious weeds.

- Forest Ecosystem and Hazardous Fuels Reduction Program – continue implementing forest fuel reduction projects, encourage the creation of group selection harvests to enhance the diversity of forest age structure, encourage conifer removal from riparian areas as appropriate.
- Scenic Program – prioritize implementing projects that improve scenic quality in "non-attainment" scenic corridors and viewpoints.
- Air Quality and Transportation Program – prioritize programs and projects that provide alternative modes of transportation over the use of the private automobile.
- Threatened, Endangered, and Sensitive Species Program – continue to support reintroduction of the Lahontan cutthroat trout and the implementation of the Tahoe Yellow Cress Conservation Strategy. Reduce road and trail densities in sensitive wildlife species protection buffers.

Update Threshold Standards

Periodically, as adequate science and technical information is available, consider Threshold Standard amendments. The suggested priority of amendments is as follows:

Science and technical information is currently available and complete to support the following amendments proposed in the Regional Plan Update:

- Pelagic Lake Tahoe Transparency Standard – improve consistency with state annual standard.
- Carbon Monoxide 8-hour Concentration Standard – improve consistency with more protective 8-hour carbon monoxide standard adopted by the states of Nevada and California.
- Northern Goshawk – amend existing management standard to reflect best available science.
- Wood Smoke and Suspended Soil Sediment – replace with state standards for particulate matter concentrations.
- Nearshore Attached Algae – adopt an interim non-degradation standard to help limit the proliferation of attached algae.
- Aquatic Invasive Species – adopt a management standard to control existing populations and prevent the introduction of new aquatic invasive species.

The recommended priorities to be considered after the Regional Plan Update for Threshold Standard amendments are:

- Lake Tahoe's Nearshore – revise existing standards to reflect best available science. Consider adoption of new or additional numeric standards to reflect the conditions and causes of observed changes in nearshore conditions.
- Pollutant Loading into Lake Tahoe – improve alignment of standards with best available science.
- Oxides of Nitrogen – acknowledge applicability of state concentration standards for NOx.
- Visibility – revise to reflect new federal visibility rules and best available science.
- Instream Flows – remove directives to establish minimum flow requirements for each stream.
- Stream Habitat – adopt bioassessment as a tool to judge stream fisheries conditions.
- Odor – remove policy statement or replace with a numerical standard capable of more complete and objective assessment.
- Other Special Interest Wildlife Species – review and revise to reflect best available science.

Other recommended areas to be considered for Threshold Standard amendments are:

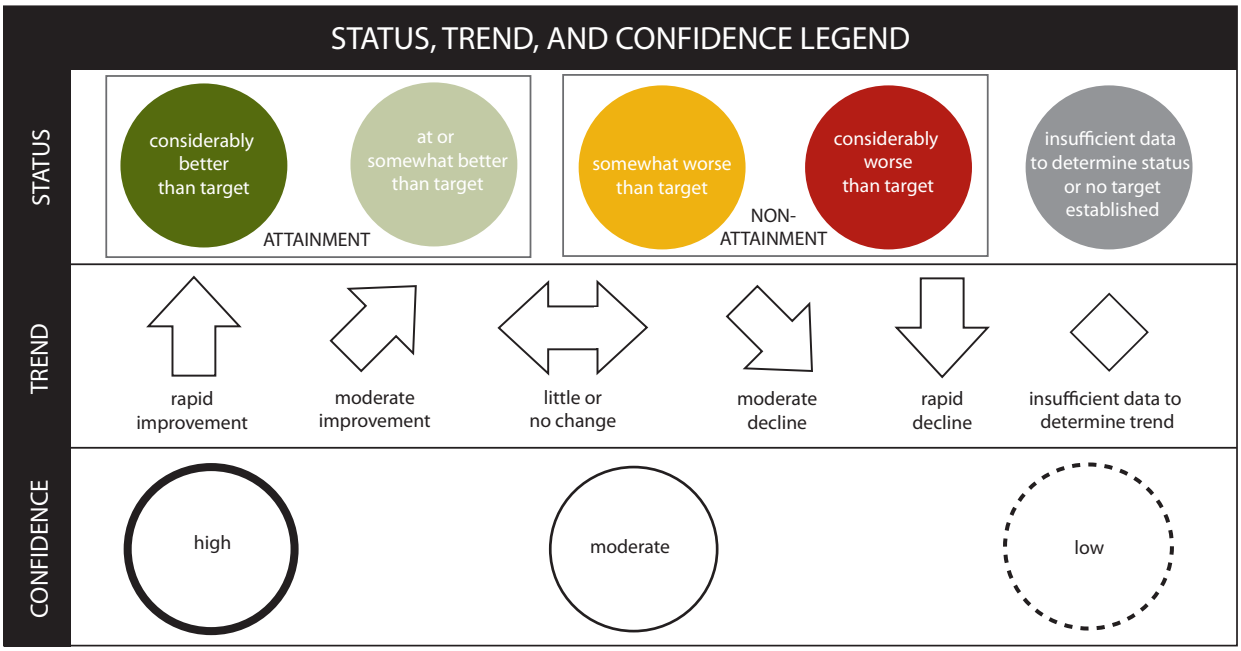
- Restructuring Threshold Categories and Threshold Standards represented in Resolution 82-11 to better integrate monitoring programs
- Consider replacement of Threshold Standards that are in the form of subjective Management Standards and Policy Statements either into goal and policy statements in the Regional Plan or, as needed, with appropriate Numerical Standards
- Revise or eliminate Threshold Standards that are not realistically achievable
- Eliminate Threshold Standards where TRPA lacks adequate enforcement authority, and consider replacement standards as appropriate

Applied Science and Monitoring Program

- Continue to develop and implement a streamlined and fully feasible Threshold Status and Trend Monitoring and Evaluation Program
- Work with partner organizations to develop a reasonable program for effectiveness monitoring of Regional Plan and EIP implementation, beginning with urban stormwater monitoring
- Enhance exchange of socioeconomic data with private and governmental entities. Incorporate socioeconomic data into environmental analysis
- Consider publishing a *Synthesis of Findings* report similar to the *2000 Lake Tahoe Watershed Assessment* to update knowledge resulting from Southern Nevada Public Lands Management Act and Nevada Division of State Lands License Plate Program grant investments in applied research

Status and Trend Summary Charts for all Standards

Reporting Icon Legends



Status Category	Description	Reporting Icon
Implemented	The Management Standard has been integrated into the *Regional Plan* as policy and/or as an ordinance or regulation and is consistently applied to a project design or as a condition of project approval as a result of project review process. Greater than three examples of programs or actions can be represented to support the Management Standard's implementation. Adopted programs or actions support all aspects of the Management Standard's implementation, or address all major threats to implementation of the Management Standard.	I
Partially Implemented	The Management Standard has been integrated into the *Regional Plan*, but is not consistently applied during the course of the project review process. No more than two examples of programs or actions can be identified to support the Management Standard's implementation and/or adopted programs or actions support some aspects of the Management Standard or address some major threats to implementation of the Management Standard.	PI
Not Implemented	The Management Standard has not been integrated into the *Regional Plan* and is not applied during the course of project review. No examples of programs or actions can be identified to support implementation of the Management Standard.	NI

Water Quality Status & Trend Summary

Standard	Status & Trend
Pelagic Lake Tahoe	
Annual Average Phytoplankton Primary Productivity	
Winter Average Secchi Disk Transparency (relative to interim target)	
Annual Average Secchi Disk Transparency (relative to interim target)	
Littoral Lake Tahoe	
Turbidity at Stream Mouths	
Turbidity away from Stream Mouths	
Tributaries	
Concentration of Suspended Sediment in Tributary Waters	
Concentration of Total Phosphorus in Tributary Waters	
Concentration of Total Nitrogen in Tributary Waters	
Annual Loading of Suspended Sediment to Lake Tahoe	
Annual Loading of Total Phosphorus to Lake Tahoe	
Annual Loading of Total Nitrogen to Lake Tahoe	
Surface Runoff	
Nutrient Concentration Standards	
Sediment Concentration Standards	
Groundwater	
Nutrient Concentration Standards	
Sediment Concentration Standards	
Other Lakes	
Nutrients	
Secchi Depth	
Other Parameters	

Air Quality Status & Trend Summary

Standard	Status & Trend
Summary of Carbon Monoxide Indicators	
Highest 1-hour Concentration of Carbon Monoxide	
Highest 8-hour Concentration of Carbon Monoxide	
Average Daily Winter Traffic Volume, Presidents Weekend	
Summary of Ozone Indicators	
Highest 1-hour Average Concentration of Ozone	
Highest 8-hour Average Concentration of Ozone	
3-year Average of the 4th Highest 8-hour Concentration	

Oxides of Nitrogen Emissions	
Summary of Visibility Indicators	
Highest 24-hour PM_{10} Concentration	
Annual Average PM_{10} Concentration	
3-year Average of the 98th Percentile 24-hour $PM_{2.5}$ Concentration	
Annual Average $PM_{2.5}$ Concentration	
Regional Visibility 50th Percentile ("Average Visibility Days")	
Regional Visibility 90th Percentile ("Worst Visibility Days")	
Sub-regional Visibility 50th Percentile ("Average Visibility Days")	
Sub-regional Visibility 90th Percentile ("Worst Visibility Days")	
Vehicle Miles Traveled (VMT)	
Nitrate Deposition - Reduce generation and transport of nitrate to achieve water quality standards	
Odor - Reduce diesel engine fumes	

Soil Conservation Status & Trend Summary

Standard	Status & Trend
Impervious Cover	
Land Capability Class 1a (allow up to 1% impervious coverage)	
Land Capability Class 1b (allow up to 1% impervious coverage)	
Land Capability Class 1c (allow up to 1% impervious coverage)	
Land Capability Class 2 (allow up to 1% impervious coverage)	
Land Capability Class 3 (allow up to 5% impervious coverage)	
Land Capability Class 4 (allow up to 20% impervious coverage)	
Land Capability Class 5 (allow up to 25% impervious coverage)	
Land Capability Class 6 (allow up to 30% impervious coverage)	
Land Capability Class 7 (allow up to 30% impervious coverage)	
Stream Environment Zones	
Preserve and Restore Stream Environment Zones	

Vegetation Status & Trend Summary

Standard	Status & Trend
Common Vegetation	
Vegetation Community Richness	
Meadow and Wetland Vegetation – Relative Abundance	
Deciduous Riparian Vegetation – Relative Abundance	
Shrub Vegetation – Relative Abundance	
Yellow Pine Forest in seral stages other than mature - Relative Abundance	

Red Fir Forest in seral stages other than mature - Relative Abundance	
Size of forest openings and juxtaposition of vegetation communities – Management Standard	
Protect and Expand Riparian Vegetation - Management Standard	
Appropriate Management Practices - Policy Statement	
Late Seral and Old Growth Forest Ecosystems	
Sub-alpine Zone	
Upper Montane Zone	
Montane Zone	
Uncommon Plant Communities	
Deep-water plants of Lake Tahoe	
Grass Lake (sphagnum fen)	
Osgood Swamp	
Freel Peak Cushion Plant Community	
Hell Hole (sphagnum fen)	
Upper Truckee Marsh	
Taylor Creek Marsh	
Pope Marsh	
Sensitive Plants	
Tahoe yellow cress (*Rorippa subumbellata*)	
Tahoe Draba (*Draba asterophora var. asterophora*)	
Cup Lake Draba (*Draba asterophora var. macrocarpa*)	
Long-petaled Lewisia (*Lewisia pygmaea longipetala*)	
Galena Creek rockcress *(Arabis rigidissima var. demote)*	

Wildlife Status & Trend Summary

Standard	Status & Trend
Special Interest Species	
Northern Goshawk	
Osprey	
Bald Eagle (Winter)	
Bald Eagle (Nesting)	
Golden Eagle	
Peregrine Falcon	
Waterfowl	
Deer	
Disturbance Zones Management Standards	
Habitats of Special Significance	

Fisheries Status & Trend Summary

Standard	Status & Trend
Stream Habitat	
Miles of "excellent" Stream Habitat	
Miles of "good" Stream Habitat	
Miles of "marginal" Stream Habitat	
Instream Flows	
Divert stream intakes to lake sources	
Non-degradation standard for instream flow	
Lahontan Cutthroat Trout	
Lake Habitat	

Noise Status & Trend Summary

Standard	Status & Trend
Single Noise Events	
Aircraft Departures/Arrivals (8 a.m. and 8 p.m.)	
Aircraft Departures/Arrivals (8 p.m. and 8 a.m.)	
Watercraft Shoreline Test	
Watercraft Pass-By Test	
Watercraft Stationary Test	
Other Single Event Threshold Standards related to vehicles (a total of 8 Threshold Standards)	
Cumulative Noise Events	
High-Density Residential Land Uses	
Low-Density Residential Land Uses	
Hotel/Motel Land Uses	
Commercial Land Uses	
Industrial Land Uses	
Urban Outdoor Recreation Land Uses	
Rural Outdoor Recreation Land Uses	
Wilderness and Roadless Land Uses	
Critical Wildlife Habitat Areas	
South Lake Tahoe Airport Transportation Corridor	
State Route 28 Transportation Corridor	
Interstate 50 Transportation Corridor	
State Route 89 Transportation Corridor	
State Route 207 Transportation Corridor	
State Route 267 Transportation Corridor	

Standard	Status & Trend
State Route 431 Transportation Corridor	
Policy Statement Assessment - Adopt noise standards for Transportation Corridors	

Recreation Status & Trend Summary

Standard	Status & Trend
Quality of Recreation Experience	
Fair Share Distribution of Recreation Capacity	

Scenic Status & Trend Summary

Standard	Status & Trend
Roadway and Shoreline Units	
Roadway Travel Units	
Roadway Scenic Resources	
Shoreline Travel Units	
Shoreline Scenic Resources	
Other Areas	
Recreation Sites and Bicycle Trails	
Built Environment